

Design Theory as a Specialised Theory

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Is there a difference between scientific theories and design theories, or models, even though both are theories, as well as models and metaphors? The distinction lies in the fact that design methodologies are based on problem solving, analysis, synthesis, and evaluation. Snodgrass (1992) declares that metaphors and models convey their meaning by referencing hermetical criteria, such as the accuracy with which the model translates the design process as experienced in everyday usage, and the degree to which the model conceals or discloses aspects of designing. In this respect, Snodgrass sees the category of metaphor or model as the key issue that needs to be addressed. The criteria for assessing a model that can be applied to the design process need to focus on how accurately the model portrays that process. Another criterion for the hermeneutical assessment of the validity of a design model is the degree to which it reveals or conceals aspects of its referent.

Snodgrass also differentiates between logic-based metaphors and hermeneutical ones, noting, '**Logic-based metaphors are scientific models, such as the atomic language model, which describe the design process in terms of a logically consistent and coherent set of relationships drawn from a scientific or mathematical theory**' (Snodgrass 1992, p.71).

He further states: '**A hermeneutical metaphor, by contrast, is one which is broad and flexible enough to give an account of the design process both as a whole and as a complex of interacting parts. For example, the metaphor of the hermeneutical circle, which sees the design process as a dialogical exchange between the designer and the design situation, has enough conceptual tolerance to preserve the wholeness of what it models, even as it describes the functioning of the parts. In summary, although the logic-based metaphor might be appropriate within the context of research, where its narrow focus and clear definition act as pointers to guide research activities, it is not appropriate when it is taken as a model of designing as a whole. The power of the logic-based metaphor inheres within its ability to concentrate on some specified and clearly defined characteristics of designing, and to structure these characteristics for research purposes. The power of the hermeneutical metaphor lies in the range and diversity of its possible interpretations, thus allowing an understanding of the design process as it changes from situation to situation**' (Ibid, p.71).

Referencing Schoen, he demonstrates that he favours the hermeneutical models, dispensing with the logic-based models that have driven design research over the last fifty years. Since these models are based on the hermeneutical circle of understanding, the dialogical exchange of questions and answers, the metaphor of play, and the metaphor of metaphor itself, they can appropriately fill the gap vacated by the problem-solving metaphor - the analysis/synthesis/evaluation metaphor, the atomic language metaphor, and the various other metaphors design science has adopted from the natural sciences (Snodgrass 1992). Gregor and Jones (2007) also propose a genealogy of design theory for Information

Systems. They posit that eight components must be achieved: '**(1) the purpose and scope, (2) constructs, (3) principles of form and function, (4) artefact, (5) testable propositions, (6) justificatory knowledge, (7) principles of implementation, and (8) an expository instantiation**' (p.329).

While Friedman differentiates design theory into basic, applied and clinical research, he also sees that most design theories involve clinical or micro-level grounded theories. These theories are generated through induction, but not of grounded theory of practice, which Friedman sees as a problem (Friedman 2003). He also recognises that designers perceive practice as research and believe that practice-based research is, in itself, a form of theory construction. He argues that design theory is not identical to the tacit knowledge of design practice. Explicit and articulate statements need to be made of all theoretical activities, and therefore, for theory construction as well (*Ibid*).

In contrast, Popov (2011) reduces design theory to a methodology, or a theory of an activity:

'Actually, a real design theory is a methodology. Theory of an activity (design is an activity, research too) is a methodology. Methodology is the study or/and theorizing about methods. From this position, theories about doing can be interpreted in a completely new ways and can be differentiated very easily from theories about natural phenomena. Here I have to mention that I simplify the subject matter. Once we enter the realm of design theory, we open Pandora's box. We have to consider a number of aspects and situations. We also need to use the apparatus of the science of artificial (as much as it exists), theory of ratification, and so on. In this way we will come to the need of developing a General Theory of Artification and actually a relevant discipline in order to deal with the questions posed by the nature of design theory. I construe ratification as a more general notion than design' (19. Feb, 2011).

In his view, as theory describes a process or action, it is intrinsically becoming a theory of reflective practice, or, how professionals think in action (Schoen 1983). This would serve to exclude taxonomy of design activities, taxonomy of a design professions, and further needed taxonomies in design.

'Clearly, any theories about designing must comport well with our material and subjective worlds, but the real test of theories lies in their validation and coherency with respect to other well supported theories that are drawn, not only from the field of design, but from the widest range of relevant theoretical constructs across all disciplines' (Love 2000, p.301).

Weick (1989) takes a specific perspective that can be helpful in design, when he defines a theory as a disciplined imagination that proceeds in the same manner as artificial selection, where the researcher '**defines, conducts, and interprets imaginary experiments**' (p.516). Weick's constructs map well to the natural process of sketching and prototyping in design, where sketches evolve from a grounded understanding of the problematic situation and systematically explore framings.

Summary

A theory is a model that can be applied to describe something, and to illustrate how it works, by showing its elements in relationship to one another. This cannot be deduced; it is a more or less a metaphor. While it is possible to make certain things visible through a metaphor, it is also a way to hide certain things. This is akin to a system, as we can never see or experience its totality. A theory is based on patterns that produce objects and allow us to discern recognizable behaviours, so that our world is more predictable. Such a theory can be applied to science, if the findings of experiments are combined, coordinated and simplified into general concepts. That is a circular process. However, this circular process is also valuable in creating theory based in theory examination of concepts. Such a metaphor, or theory, belongs to Popper's World 3 - it is the objective world of theories, knowledge and problems. In that respect, taking objects from another world cannot prove a theory. Theory based on theory can only be verified through theory. Looking at the relationship between theory and concepts, it is evident that the concepts must interrelate, and must be productive between centre and periphery. No concept can be reduced without altering the productivity or destroying it. Moreover, the central concepts must be well defined and harmonized, and different levels of discourse must be distinguished. More general aspects must relate to less general and to special cases.

Two methods can be applied to arrive at a theory - namely those based on quantitative interpretations of nature and those utilising theory-then-research strategy, which is nothing else than a circle between theory construction and empirical inquiry. This, however, requires changes in the statements that do not correspond to the research results.

The specification for design theory, while less obvious, is still identifiable. For instance, hermeneutical metaphors might be more applicable than the logical ones. Nonetheless, design theory specification should include purpose and scope, constructs, form and function, artefact, testable propositions, justificatory knowledge, principles of implementation, and an expository instantiation.

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